

CLAIMS

1. A fuel cell comprising:
a fuel electrode, an oxygen electrode and a proton conductor film layer disposed between the fuel electrode and the oxygen electrode;
5 at least one of the fuel electrode and the oxygen electrode comprising an electrode material composed of powders of a carbonaceous material coated on a surface thereof with a proton conductor material wherein the proton conductor material comprises a carbon-based material substantially composed of carbon forming a matrix structure that has one or more proton dissociative groups
10 introduced to the matrix structure.
2. The fuel cell according to claim 1 wherein the carbonaceous material of the powders comprises a carbonaceous material formed of fibers.
- 15 3. The fuel cell according to claim 2 wherein the carbonaceous material formed of fibers is selected from the group consisting of carbon nano-tubes, a fibrous graphite material and mixtures thereof.
4. The fuel cell according to claim 1 wherein at least one of the fuel
20 electrode and the oxygen electrode comprises a catalyst having a metal component.
5. The fuel cell according to claim 4 wherein the metal component is selected from the group consisting of platinum, platinum alloy and combinations thereof.
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6. The fuel cell according to claim 1 wherein the proton conductor film layer comprises a material similar to the proton conductor material.
7. The fuel cell according to claim 1 wherein the carbon-based material
30 of the proton conductor material is selected from the group consisting of carbon clusters, carbon nano-tubes and mixtures thereof.

8. A method for the preparation of a fuel cell including a fuel electrode, an oxygen electrode and a proton conductor material disposed therebetween comprising the steps of:

- 5 providing a carbonaceous material in a powder form;
 mixing the carbonaceous material with a solvent that contains a proton conductor wherein the proton conductor comprises a carbon-based material substantially composed of carbon and one or more proton dissociate groups introduced to the carbon-based material;
- 10 coating a surface of the carbonaceous material with the proton conductor; and
 forming at least one of the fuel electrode and the oxygen electrode with the carbonaceous material.

15 9. The method according to claim 8 wherein the carbon-based material of the proton conductor comprises a matrix structure into which the proton dissociative groups are introduced.

20 10. The method of claim 8 wherein the carbonaceous material comprises a carbonaceous material composed of carbon fibers.

25 11. The method of claim 8 wherein the carbon-based material is selected from the group consisting of carbon clusters, carbon nano-tubes and mixtures thereof.